

Ocean Circulation, Sea Level, and Climate

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More than 80% of the heat from global warming in the past 50 years has been absorbed by the earth's oceans. Understanding ocean circulation responsible for the absorption and redistribution of the heat trapped in the earth system by the increasing greenhouse gases is thus critically important to the prediction of future climate change. The best way to observe large-scale patterns of ocean currents and their changes is to measure the height of sea surface, which is used to compute the surface pressure of the ocean for determining ocean current velocity the same way as determining wind velocity from atmospheric pressure. NASA, in collaboration with Centre National d'Etudes Spatiales of France, has launched a series of missions starting with TOPEX/Poseidon, followed by Jason-1 and Jason-2 that have provided 17 years' worth of global sea surface height data record. For the first time, global ocean circulation and sea level change have been monitored over a long period of time, allowing fundamental understanding of global change of the ocean from weekly to decadal time scales. This talk will summarize the most important findings addressing the changing ocean currents and sea level in relation to global climate change.